

337. Title:Nanopattern enabled terahertz all-optical switching on vanadium dioxide thin film  
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Abstract:We demonstrate ultrafast all-optical control of terahertz (THz) radiation through nanoresonators, slot antennas with a hundred micron length but submicron width in thin gold layers, fabricated on vanadium dioxide (VO<sub>2</sub>) thin films. Our THz nanoresonators show almost perfect transmission at resonance. By virtue of phase transition of VO<sub>2</sub> from insulating to metallic state, induced in subpicosecond time scale by moderate optical pump, ultrafast control of THz transmission is enabled. This is compared to bare VO<sub>2</sub> films where no switching dynamics are observed under similar conditions.